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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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MANELLI DENISON & SELTER
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WASHINGTON, DC 20036-3307

EXAMINER	
CHEN, WENPENG	
ART UNIT	PAPER NUMBER
2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/21/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/220,970	MILLS, RANDELL L.	
	Examiner	Art Unit	
	Wenpeng Chen	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-322 is/are pending in the application.

4a) Of the above claim(s) 1-50 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 51-322 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 3/27/2006.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Examiner's Remarks

1. On 3/33/2005, the Board of Patent Appeals and Interference (BPAI) remanded the appeal case back to the Examiner (1) for the Applicant to enter definitions of "Fourier Series in Fourier Space" and "Probability Operand" in the specification and (2) for the Examiner to make further consideration after the entry. In the Remand, BPAI considered that adding the definitions would not introduce new matter. The Examiner acknowledged this BPAI's decision. A new Office action is given below.

Claim Rejections - 35 USC § 101

(non-statutory)

2. Claims 307-322 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claimed invention is a computer related invention. The Computer-Implemented Invention Guidelines issued by the U.S. Patent and Trademark Office describe the procedures for examining such inventions. A flow chart of the procedures was attached at the end of paper #17.

For Claims 307-322, we examined them according to box 6 in the flow chart. The step in box 6 is to determine whether the invention as defined by the claims falls within one of the three following categories of unpatentable subject matter: (1) Functional descriptive material such as a data structure per se or a computer program per se, (2) Non-functional descriptive material such as music, literary works or pure data, embodied on a computer readable medium; or (3) A natural

phenomenon such as energy or magnetism. *The invention as defined by Claims 307-322 is a data structure stored in a memory. However, the data are not functional and therefore are non-statutory as explained below.*

With regard to Claim 313

Although Claim 313 recites a data structure in a memory, the recited features in the claim body do not constitute a functional description material. Claim 313 recites a plurality of transduced data objects. The data objects are just a compilation of various measured data. As shown in Fig. 3 and pages 8-11, the plurality of transduced data objects can be just output from pixels of a CCD camera. In page 9, lines 8-9, the Applicant explicitly stated that "since the structure of a Fourier series is known in the art, only the parameters need to be stored in a digital embodiment." For a CCD camera, the camera (a transducer) transduces an incoming light into electrical signals by each pixel of the CCD. The location of the pixel in the CCD camera and the electrical signals associated with each pixel are the parameters. The clause in lines 8-11 starting with the word "wherein" in just an intended use and does not provide any functional limitation to the transduced data objects. Any picture data taken by a camera and stored in a memory meet the recited requirement, because they can be used for various image processing including the intended use of association with spectral analysis. The picture data stored in a memory are just data per se such as music or text document. They are just non-functional information provided for a functional machine or processor. The functionality is provided by the machine or processor, not by the compilation of data which is termed data structure here.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 51-322 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

a. The whole specification describes only an explicit embodiment. The explicit embodiment is supported by the equations shown in the specification. The specification also includes various alternative embodiments to the explicit one. However, because of the untraditional definitions of the steps the alternative embodiments do not provide adequate descriptions to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use all the alternative non-explicit embodiments. For example, the passage in lines 18-25 of page 11 states that "the characteristic modulation is encoded as a delay in time by storing the Fourier series in a specific portion of the Input layer section of the memory wherein the specific portion has n+1 sub time intervals." Not adequate description is given in this paragraph what specific function is used how the encoding is performed.

b. The explicit embodiment of the application is disclosed in Figs. 1-2 and all the equations. It comprises an input layer, an association layer, a string ordering layer, a predominant

configuration layer, and a memory. All Claims 51-322 are supported by these five elements. When one cannot implement any of the above elements, one cannot implement any of Claims 51-322.

The Examiner spent many hours trying to figure out how to implement all of the five elements. Unfortunately, the Examiner cannot follow the specification to do so. The Examiner thus concludes that the specification cannot enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention defined by Claims 51-322. Detailed questions are given below. As long as the Applicant can answer the Examiner's questions and demonstrate the enabling of each questioned step, the Examiner will withdraw the rejection.

In the amendment allowed by the Board to be entered, the Applicant explicitly defined "Fourier series in Fourier space" as follows.

"Fourier series in Fourier space is a sum of trigonometric functions in frequency space where each variable is frequency and the parameters of the Fourier series are input data or processed input data."

According to Eq. (37.32), a Fourier Component (FC) is defined as a function in k space, such as $V(k_\rho, k_z)$ that is a function of (k_ρ, k_z). The function is defined with a set of parameters of an element. In Eq. (37.32), the parameters and the explicit forms of trigonometric functions on the right hand side disappear after summation to create $V(k_\rho, k_z)$ on the left hand side. Accordingly, $V(k_\rho, k_z)$ is indexed with the element's index m, but not explicitly carry any information of the parameters.

According to Eq. (37.33), a Fourier series is a "SFCs" (series of Fourier Components) is also defined as a function in k space, such as $V_{\sum m}(k_\rho, k_z)$ that is also a function of (k_ρ, k_z). After summation of FCs to form $V_{\sum m}(k_\rho, k_z)$, it does not explicitly carry even the index information of each element m. As a consequence, no mathematical operation can be applied to each individual FC after a Fourier series (FS) is formed. For example, modulation or sampling to a FS can only be specified by (k_ρ, k_z), but not m. According to Eq. (37.107), a sum of FSs of various transducers can be formed and is also defined as a function in k space, such as $V_{\sum s,m}(k_\rho, k_z)$ that is also a function of (k_ρ, k_z). After summation of FSs to form $V_{\sum s,m}(k_\rho, k_z)$, $V_{\sum s,m}(k_\rho, k_z)$ does not explicitly carry the index information of each FS, s, nor element m. As a consequence, no mathematical operation can be applied to each individual FC or each individual FS after a string is formed. For example, modulation or sampling to a string can only be specified by (k_ρ, k_z), but not s or m.

Question (1)

In Fig. 21A, a sum of FSs is formed and stored in a register according the second equation in Fig. 21A. One ordinary person skill in the art knows how to do it based on this equation. However, one ordinary person skill in the art does not know how to recall Fourier series based the third equation of Fig. 21A. As explained above, after the sum of FSs is formed according the second equation of Fig. 21A, the only information remained is the left hand side of the second equation $V_{\sum s,m}(k_\rho, k_z)$. It is only an equation of (k_ρ, k_z). All the information on the right hand side of the second equation are not preserved after summation, without each information of the infinite terms on the right hand side of the second equation in Fig. 21A, how can one perform the right hand side of the third second equation in Fig. 21A to recall a Fourier series?

Question (2)

As shown in Fig. 21B and pages 15-16, the Association requires computation according to the equation in page 16. In the equation, the Fourier transform of a delayed Gaussian filter are used to multiply each FS specified by parameter s. As discussed above with regard to recalling a FS, all the information related to each FS indexed with s and to FC indexed with m are not preserved after summation, without each information of the infinite terms specified with indexes s and m, how can one perform calculation according to the equation in page 16? The same question also applied to the process of applying Gaussian filter to an input string shown in Fig. 21B.

Question (3)

The probability expectation value is calculated based on the equation in line 7, of page 14 and in Fig. 21B. Values of the amplitude of spectral similarity, β_s^2 and frequency difference angle, ϕ_s, are need for the equation. As Explained above, after the formation of Fourier series, the parameters N_{m1}, ρ_{0m1}, N_{m2}, ρ_{0m2} are not preserved. How are the parameters N_{m1}, ρ_{0m1}, N_{m2}, ρ_{0m2} recovered in steps 34 and/or 36 of Fig. 2 so they can be used in last equation of page 14 to calculate the amplitude of spectral similarity, β_s^2, and in the first equation in page 15 to calculate frequency difference angle, ϕ_s, between at least two filtered or unfiltered FSs, or a FS and a string?

c. Therefore, the one skilled in the art cannot follow any of the embodiments to achieve the goal of the proposed invention.

Claim Rejections - 35 USC § 101

(non-operative)

5. Claims 51-322 are rejected under 35 U.S.C. 101 because they are non-operational and do not have utility.

The embodiment of the application is disclosed in Figs. 1-2. It comprises an input layer, an association layer, a string ordering layer, a predominant configuration layer, and a memory. All Claims 51-322 are supported by these five elements. When any one of the above elements is not operative, it does not have any utility.

In the specification, the Applicant correctly pointed out that the following equation in page 40 describes how a time function can be delayed by multiplying a factor $e^{-j2\pi f}o$ to each corresponding component $e^{j2\pi f}$ in Fourier space

$$x(t)=\int_{-\infty}^{\infty}X(f)e^{j2\pi ft}df \qquad X(t)=\int_{-\infty}^{\infty}x(t)e^{-j2\pi ft}dt$$

$$\text{Delay} \qquad \delta(t-t_0) \qquad \Leftrightarrow \qquad e^{-j2\pi ft_0} \qquad (37.109)$$

---- (1)

This is a key step in storing different Fourier components or series in different memories with defined delay information that is later used to recall the stored series or strings for comparison and association. As shown in the above equation that there is an important attribute for this process to work: the multiplying a factor $e^{-j2\pi f}o$ shall have the exact same frequency f

such as that of $e^{j2\pi f}$. Please note here that frequency f and its negative counterpart -f are considered as two different frequencies. The Applicant also teaches in page 8 a Fourier series as shown below with k_ρ and k_z as two parameters of Fourier space.

$$\sum_{m=1}^{M}\sum_{n=-\infty}^{\infty}\frac{4\pi}{1+\frac{k_z^2}{k_\rho^2}}a_{0_m}N_{m_{\rho 0}}N_{m_{z0}}\sin\left(\left(k_\rho-n\frac{2\pi}{\rho_{0_m}}\right)\frac{N_{m_{\rho 0}}\rho_{0_m}}{2}\right)\sin\left(\left(k_z-n\frac{2\pi}{z_{0_m}}\right)\frac{N_{m_{z0}}z_{0_m}}{2}\right)$$

--- (2)

The Applicant considered k_ρ as one of the frequency and expressed its delayed correspondence in page 11 as shown below with the exponential factor in front of the first "sin".

$$\sum_{m=1}^{M}\sum_{n=-\infty}^{\infty}\frac{4\pi}{1+\frac{k_z^2}{k_\rho^2}}a_{0_m}N_{m_{\rho 0}}N_{m_{z0}}e^{-jk_\rho(\rho_{p_m}+\rho_{i_m})}\sin\left(k_\rho\frac{N_{m_{\rho 0}}\rho_{0_m}}{2}-n\frac{2\pi N_{m_{\rho 0}}}{2}\right)\sin\left(k_z\frac{N_{m_{z0}}z_{0_m}}{2}-n\frac{2\pi N_{m_{z0}}}{2}\right)$$

--- (3)

Equation (3) cannot produce the needed delay, because the following reasons.

-- It is well known that $\sin(fx) = (e^{jfx} + e^{-jfx})/(2j)$. So the first sine function in equation (3) above has two frequencies, a pair of positive and negative f. However, the exponential factor in front of the first "sin" corresponds only to one f, the positive frequency f.

-- Furthermore its multiplication factor for the proposed process for generating delay does not have the exact same frequency f. Their frequencies are listed in the table below. The first sine function in equation (3) has a frequency depending on the data parameters, which are associated with the measured information that can vary from measurement to measurement.

They are not related to time. As expressed in page 11, the exponential factor in front of the first "sin" is related to time through time delays.

function	frequency
$\sin\left(k_\rho \frac{N_{m_{\rho 0}} \rho_{0_m}}{2} - n\frac{2\pi N_{m_{\rho 0}}}{2}\right)$	$\pm \quad k_\rho \frac{N_{m_{\rho 0}} \rho_{0_m}}{2}$
$e^{-jk_\rho\left(\rho_{\rho_m} + \rho_{t_m}\right)}$	k_ρ

Now it is evidently that the equation appearing in page 11 of the present specification cannot generate any delayed form of its corresponding function of that shown in page 8. Therefore, the recall of data will be correlated to its corresponding input data. Data can be stored in a memory. However, the stored data cannot be meaningfully recalled. As a consequence, meaningful comparison, recognition, and association cannot be achieved. It results no utility of the presently claimed invention because recognition and association are not operative.

Examiner's Comments with Regard to Prior Art

6. Claims 51-322 are not taught in the prior art.

In addition to those reasons given in the previous Office Action, the reason of this conclusion is given below.

The prior art fails to teach the method of Claim 157 and the medium of 267 which specifically comprise the following feature(s) in addition to other recited limitations:

-- generating an activation probability parameter based on a prior activation probability parameter and a weighting based on the activation rate of the corresponding component;

-- generating a probability operand based on the activation probability parameter;

-- if the probability operand is a desired value, activate any component of the group recited in Claim 157, wherein a pattern is recognized when the operand is the desired value;

-- repeating steps until a pattern is recognized.

The prior art fails to teach the methods of Claims 271 and 285, the system of Claim 281, the media of 290 and 299, the product of Claim 304, the data structures of Claims 307 and 313 which specifically comprise the following feature(s) in addition to other recited limitations:

-- receiving data representative of physical characteristics within an input context of the physical characteristics and transforms the data into a Fourier series in Fourier space;

-- receiving a plurality of the Fourier series from the memory, recognized a pattern, forms a string comprising a sum of Fourier series, and storing the string in a memory;

-- receiving the string and forming complex ordered strings, and stores complex ordered strings;

-- retrieving multiple ordered strings, forms complex ordered strings, stored the complex ordered strings, and activates the components of any of the layers of the system to recognize a pattern and establish an ordered formatted pattern;

-- sampling and modulating at least two of the Fourier series with at least two filters to form the modulated Fourier series;

-- causing an activation of an associated Fourier components based on activation probability;

-- associating plurality of Fourier series based on a probability distribution;

-- coupling based on spectral similarity.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wenpeng Chen whose telephone number is 571-272-7431. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 571-272-7778. The fax phone numbers for the organization where this application or proceeding is assigned are 571-273-8300 for regular communications and 571-273-8300 for After Final communications. TC 2600's customer service number is 571-272-2600.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2600.

Wenpeng Chen
Primary Examiner
Art Unit 2624

December 18, 2006